Attachment "A" SWG-2006-01048

MITIGATION PLAN

11-20-08

COE Permit Application No. 24279
Laguna Shores Road – Graham to Hustlin' Hornet
City of Corpus Christi

The proposed project site is a 60' wide by 5,400'± long City of Corpus Christi road right-of-way encompassing approximately 7.4 acres of land adjacent to the Laguna Madre as shown on Figure MP1, **LOCATION MAP**. Also shown on the Location Map, approximately 0.7 miles north of the proposed project site, is the proposed Off-site Mitigation Area. The proposed land uses for the project site are shown on Figure MP2, **PROPOSED LAND USE**, and Figure MP3, **SITE PLAN**. See Figures MP5 and MP6, **SECTIONS**, for vertical alignment of the proposed road improvements.

In May 2006, RVE, Inc. prepared and submitted to the COE an Alternatives Analysis for the project site. Six (6) alternatives were considered. Alternative #4 was selected, because it best met the design criteria and project objectives. Alternative #4 requires the utilization of the entire 60' right-of-way of Laguna Shores Road which unavoidably impacts 2.39 acres of wetlands. The impacted wetland areas are described and quantified in Figure MP7, **ON-SITE WETLANDS UTILIZATION**. The unavoidable impacts to existing wetlands shall be mitigated at the Off-site Mitigation Area. See Figure MP8, **OFF-SITE MITIGATION AREA – EXISTING LAND USE**.

For the unavoidable impacts to 0.27 acres of shallow waters seagrass (Shoalgrass) at the project site, 0.81 acres of unvegetated shallow waters (SW) shall be converted into shallow waters seagrass (SG). For the unavoidable impacts to 0.65 acres of SW at the project site, 0.33 acres of existing SW shall be converted into SG. The mitigation plan proposes to convert the entire unvegetated shallow waters frontage at the Off-site Mitigation Area into SG amounting to 1.99 acres of impact to existing SW. See Figure MP9, **OFF-SITE WETLANDS UTILIZATION**. For these impacts, 0.99 acres of existing SW shall be converted into SG. In total, 2.13 acres of SG shall be created at the Off-site Mitigation Area - 1.99 acres of SW conversion and 0.14 acres of creation from existing uplands. See Figures MP10, **OFF-SITE MITIGATION AREA – PROPOSED LAND USE**.

For the unavoidable impacts to 0.25 acres of sand/mud flats at the project site, 0.50 acres of sand/mud flats in-kind replacement habitat will be created. For the unavoidable impacts to 0.91 acres of low marsh at the project site, 1.82 acres of low marsh in-kind replacement habitat will be created. For the unavoidable impacts to 0.31 acres of high marsh at the project site, 0.62 acres of high marsh in-kind replacement habitat will be created. See Figures MP10, **OFF-SITE MITIGATION AREA – PROPOSED LAND USE**.

In total, 0.14 acres of SG, 0.50 acres of sand flats, 1.82 acres of low marsh, and 0.62 acres of high marsh shall be created from existing uplands and 1.99 acres of existing SW shall be converted into SG by the plan, totaling 5.07 acres of created wetlands. See Figure MP11, **MITIGATION TABLE**. With the exception of the SW, no other existing wetlands shall be impacted at the Off-site Mitigation Area.

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The limits of the mitigation areas are shown on Figure MP12, **OFF-SITE MITIGATION MAP**.

A detailed topographic survey was conducted at the Off-site Mitigation Area, and existing contours are shown on Figure MP8, **OFF-SITE MITIGATION AREA – EXISTING LAND USE**. The topographic survey and all proposed excavation elevations are based on the NGVD 29 datum.

The proposed SG mitigation area is located within all of the available existing SW located across the frontage of the Off-site Mitigation Area. The mudline elevations of the SW range from -0.32 up to +1.14. The lower elevation of -0.32 is also the upper elevation of the adjacent SG. The conversion of the SW into SG shall be accomplished by excavating the existing SW to an elevation of -0.32± and allowing the existing SG to naturally propagate into the region. The propagation of the SG will be monitored per the Monitoring Plan and Success Criteria described below.

The proposed sand flats mitigation area is located in an upland area at the mitigation site, which currently contains a 60" reinforced concrete stormwater pipe (RCP) and outfall. Approximately 480 linear feet of 60" RCP will be removed, and the existing headwall shall be removed and reconstructed at the upstream end of the 480 linear feet. The natural ground in the area where the RCP is removed will be excavated to elevation 1.25±, the elevation of existing sand flats at the site, and natural propagation shall create the 0.50 acres of new sand flats. The propagation of the sand flats will be monitored per the Monitoring Plan and Success Criteria described below. A stabilized conveyance channel from the location of the new headwall to the Laguna Madre shall be constructed down the center of the proposed sand flats.

A total of 1.82 acres of low marsh mitigation area will be created within five (5) separate existing uplands locations on the mitigation site. The natural ground elevation at the five (5) locations will be excavated to an elevation of 1.5±, which is the ground elevation of the adjacent existing low marsh regions. Creation of the 1.82 acres of low marsh habitat will occur by natural propagation of the surrounding low marsh wetlands into the newly excavated areas. The propagation of the low marsh habitat will be monitored per the Monitoring Plan and Success Criteria described below.

The proposed 0.62 acres of high marsh mitigation area will be created by excavating uplands adjacent to existing high marsh on the mitigation site. The natural ground elevation will be excavated to an elevation of 2.0±, which is the ground elevation of the adjacent existing high marsh region. Creation of the 0.62 acres of high marsh habitat will occur by natural propagation of the adjacent high marsh wetlands into the newly excavated areas. The propagation of the high marsh habitat will be monitored per the Monitoring Plan and Success Criteria described below.

Excavation of uplands will be accomplished initially by mechanical scraper, which will be routed to-and-from the excavation areas to avoid existing wetlands. As work progresses, excavation efforts may require a backhoe and dump truck, which will also be routed for avoidance of existing wetlands. All excavated materials will be stored temporarily on-site at the location shown on Figure MP10, **OFF-SITE MITIGATION AREA – PROPOSED LAND USE**, and

ultimately disposed of off-site. Runoff from the temporary spoils storage site will be filtered by best management practices (silt fence, hay bales, etc.), which will remain in place until natural vegetation has been established.

Excavation of the existing SW area shall be accomplished by a hydraulic dredging operation. The spoils materials from this excavation shall be hauled off site for disposal.

Completion Plan:

All mitigation will be completed within 12 months of initiating work in jurisdictional area. No nesting birds were observed at the mitigation site during the Threatened and Endangered Species Survey of the property conducted on September 17, 2008 by Steiner C. Kierce. The T&E Survey report is attached for reference. The schedule may be adjusted if nesting birds are encountered.

Protection Plan:

Approximately 15 acres of land that encompass the proposed wetland creation areas, the existing wetlands and upland areas will be protected from vehicular traffic by the installation of a bollard and cable fence around the perimeter of the area as shown on Figure MP10, **OFF-SITE MITIGATION AREA – PROPOSED LAND USE**.

Monitoring Plan and Success Criteria:

1. A re-vegetation survey of the mitigation areas will be performed 6 months after completion of mitigation site.

2. Written reports that contain percentage of plant species coverage, dominant plant species present, and photo-documentation detailing re-vegetation of the mitigation site must be submitted to the COE/Corpus Christi Field Office within 30 calendar days of completing the re-vegetation survey.

3. If after one year the site does not have at least 35% aerial coverage, those areas that are not vegetated will be reconditioned with hay mulch.

4. If after three years the site does not have at least 70% aerial coverage, provisions will be undertaken to determine cause, the necessary corrections made, and/or additional mulching/seeding/planting will be made to attain the specified aerial coverage.

5. Additional re-vegetation survey reports will be submitted to the COE / Corpus Christi Field Office at 2 year, and 3-year intervals. The re-vegetation survey reports will include species, coverage, and photos. The success criteria for the reports will be based on the existing types of species identified in the area by the accompanying Wetlands Delineation Survey by Jim E. Warren dated October, 2008 and as classified below.

- Seagrass – These are waters of the Laguna Madre which are deeper, not as much affected by wave action and tidal fluctuations, and support a stand of sea grasses such as Shoalgrass (Halodule beaudettei).
- Sand Flats – These wetlands are inundated by normal high tides. They are mostly denuded of vegetative cover except for scattered small colonies of mostly Creeping and Annual Glasswort and Shoregrass (Monanthochloe Littoralis).

- Low Marsh (Upper edges of normal high tide) – Vegetative cover is dominated by non-grass species such as Annual Glasswort, Creeping Glasswort, and Sea-ox-eye-daisy.

- Low Marsh (Just above normal high tide) – Vegetative cover is dominated by grasses such as Marshhay cordgrass (Spartina Patens) and Fall Panicgrass (Panicum Dichotomiflorum).

- High Marsh – Cattails (Typha Latifolia), Pennywort (Hydrocotyle Umbellate), Marshhay cordgrass (Spartina Patens).

6. Upon attainment of the specified coverages, a request for final inspection will be sent to the COE / Corpus Christi Field Office. Upon acceptance by the COE / Corpus Christi Field Office, the annual inspections will cease and the property encompassed by the bollard and cable fence mentioned above under *Protection Plan* above will be dedicated as a Conservation Easement.

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AERIAL PHOTOGRAPH WITH EXISTING WETLANDS BOUNDARIES

SG — SHALLOW WATERS, SEAGRASS (OFF-SITE)

SW — SHALLOW WATERS, UNVEGETATED (2.14 AC.)

SF — SAND FLATS (3.60 AC.)

LM — LOW MARSH (3.72 AC.)

HM — HIGH MARSH (0.24 AC.)

UP — UPLANDS

PREVAILING WINDS

GRAPHIC SCALE
0 100' 200' 300'

PURPOSE/ACTIVITIES: RAISE AND WIDEN LAGUNA SHORES ROADWAY.

DATUM: HOR. – NAD 83
VET. – NGVD 29

rve engineering-diving-surveying

CITY OF CORPUS CHRISTI

OFF-SITE MITIGATION AREA EXISTING LAND USE

CITY OF CORPUS CHRISTI
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CORPUS CHRISTI, TEXAS 78469

RVE, INC.
P.O. BOX 2927
CORPUS CHRISTI, TEXAS 78403

LAGUNA SHORES ROAD GRAHAM TO HUSTLIN HORNET

IN: LAGUNA MADRE
AT: LAGUNA SHORES RD. BETWEEN GRAHAM RD. & HUSTLIN HORNET DR.
COUNTY: NUECES
STATE OF: TEXAS
APPLICATION BY: CITY OF CORPUS CHRISTI

FIGURE MP8 DATE: OCT 2008

RVE NAME: R:\CLIENTS\CITY OF CC-7\06023 Laguna Shore Rd-Graham to Hustlin Hornet (#6278)\CAD\Mitigation\Mitigation Plan Exhibits\MP8-Off-Site Mitigation Area Existing Land Use.dwg DATE: 20 NOV 2008 TIME: 8:14

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OFF-SITE WETLAND UTILIZATION TABLE
OFF-SITE MITIGATION AREA

	WETLANDS TOTAL (acres)	WETLANDS AVOIDED (acres)	CONVERTED TO OTHER WETLANDS ONSITE (acres)	WETLANDS FILLED (acres)
SEAGRASS	0	0	0	0
SHALLOW WATER	2.14	0	1.99	0
SAND FLATS	3.60	0	0	0
LOW MARSH	3.72	0	0	0
HIGH MARSH	0.24	0	0	0
TOTAL	9.70	0	1.99	0
	100%	0%	20%	0%

PURPOSE/ACTIVITIES: RAISE AND WIDEN LAGUNA SHORES ROADWAY.

DATUM: HOR. – NAD 83
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CITY OF CORPUS CHRISTI

OFF–SITE
WETLANDS UTILIZATION

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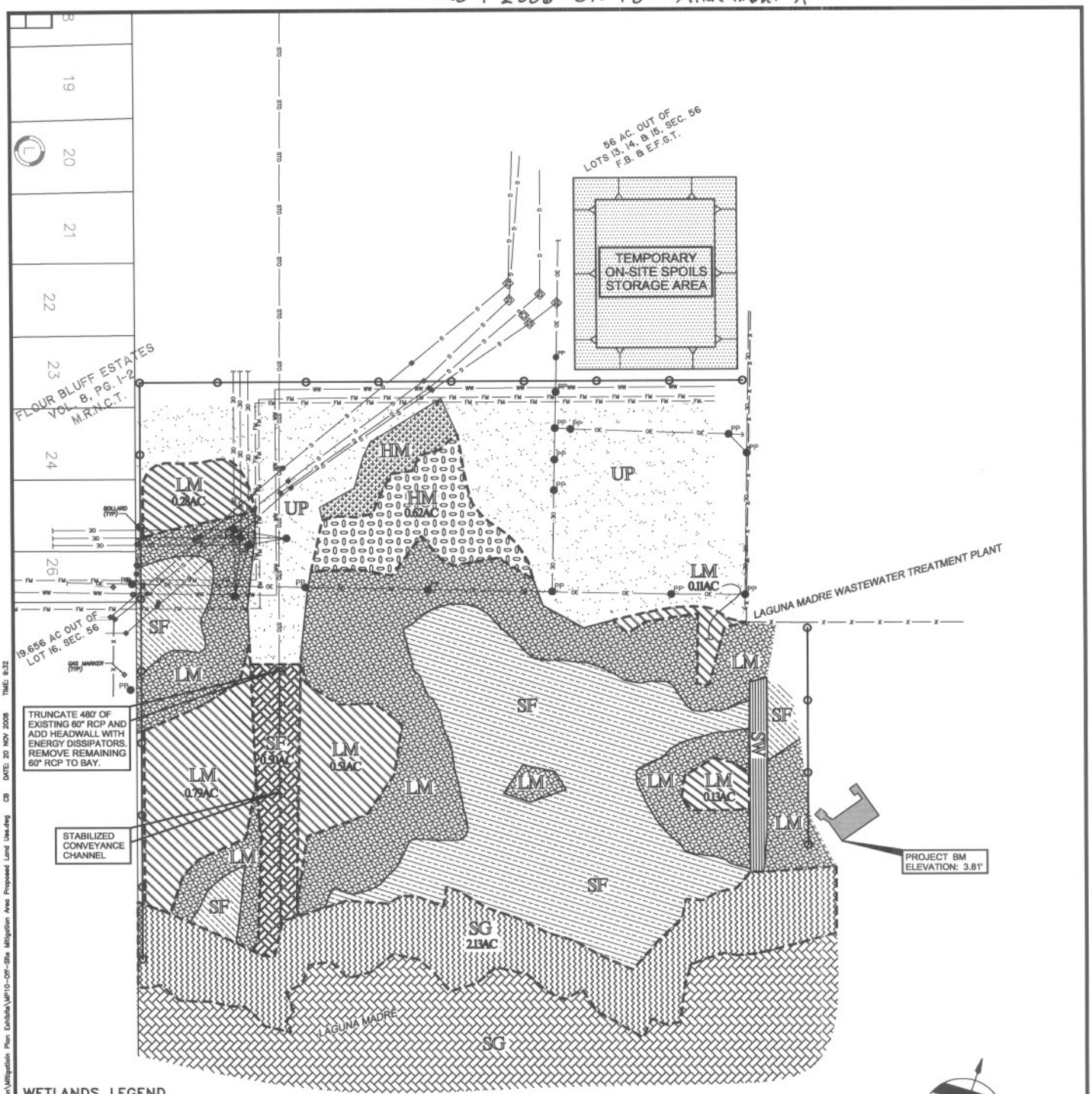
COUNTY: NUECES
STATE OF: TEXAS
APPLICATION BY: CITY OF CORPUS CHRISTI

FIGURE MP9 DATE: OCT 2008

RVE NAME: R:\CLIENTS\CITY OF CC-7\05023 Laguna Shore Rd-Graham to Hustlin Hornet (#6278)\CAD\Mitigation\Mitigation Plan Exhibits\MP9-Off-Site Wetlands Utilization.dwg CB DATE: 20 NOV 2008 TIME: 9:50

SWG-2006-01048 Attachment "A"



WETLANDS LEGEND

EXISTING WETLANDS

SG	EXISTING SHALLOW WATERS SEAGRASS	HM	EXISTING HIGH MARSH
SW	EXISTING SHALLOW WATERS UNVEGETATED	UP	EXISTING UPLANDS
SF	EXISTING SAND FLATS		
LM	EXISTING LOW MARSH		

CONSTRUCTED WETLANDS

SG	SHALLOW WATERS SEAGRASS
SF	SAND FLATS
LM	LOW MARSH
HM	HIGH MARSH

LEGEND:

PP	POWER POLE
STO	STORM LINE
OE	OVERHEAD ELECTRIC
WW	WASTEWATER LINE
FM	FORCEMAIN LINE
G	GAS LINE
X	FENCE
10	CONTOUR
	PROPOSED BOLLARD AND CABLE FENCE

PREVAILING WINDS

GRAPHIC SCALE
0 100' 200' 300'

PURPOSE/ACTIVITIES: RAISE AND WIDEN LAGUNA SHORES ROADWAY.

DATUM: HOR. – NAD 83
VET. – NGVD 29

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CITY OF CORPUS CHRISTI

OFF-SITE MITIGATION AREA PROPOSED LAND USE

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COUNTY: NUECES
STATE OF: TEXAS
APPLICATION BY: CITY OF CORPUS CHRISTI

FIGURE MP10 DATE: OCT 2008

RVE NAME: R:\CLIENTS\CITY OF CC-7\05023 Laguna Shore Rd-Graham to Hustlin Hornet (#4278)\CAD\Mitigation\Mitigation Plan Exhibits\MP10-Off-Site Mitigation Area Proposed Land Uses.dwg DATE: 20 NOV 2008 TIME: 9:32

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WETLANDS MITIGATION SUMMARY TABLE

WETLAND TYPE	AREA IMPACTED	PROVIDED MITIGATION AREA	PROVIDED MITIGATION RATIO
LAGUNA SHORES ROAD REHABILITATION			
SHALLOW WATERS SEAGRASS	0.27 AC.	0.81 AC.	3:1
SHALLOW WATERS UN-VEGETATED	0.65 AC.	0.33 AC.	0.5:1 SEAGRASS
SAND/MUD FLATS	0.25 AC.	0.50 AC.	2:1
LOW MARSH	0.91 AC.	1.82 AC.	2:1
HIGH MARSH	0.31 AC.	0.62 AC.	2:1
SUBTOTAL LAGUNA SHORES RD REHAB	2.39 AC.	4.08 AC.	
LAGUNA MADRE WWTP MITIGATION SITE			
SHALLOW WATERS UN-VEGETATED	1.99 AC.	0.99 AC.	0.5:1 SEAGRASS
SUBTOTAL LAGUNA MADRE WWTP	1.99 AC.	0.99 AC.	
TOTAL WETLAND IMPACTS/MITIGATION			
SHALLOW WATERS SEAGRASS	0.27 AC.	2.13 AC.	
SHALLOW WATERS UN-VEGETATED	2.64 AC.	0.00 AC. (1.32 AC. SEAGRASS)	
SAND/MUD FLATS	0.25 AC.	0.50 AC.	
LOW MARSH	0.91 AC.	1.82 AC.	
HIGH MARSH	0.31 AC.	0.62 AC.	
TOTAL IMPACTS/ MITIGATION	4.38 AC.	5.07 AC.	

SUMMARY

SHALLOW WATERS - SEAGRASS CREATED ——— 2.13 AC.
SHALLOW WATERS - UN-VEGETATED CREATED ——— 0.00 AC.
SAND/MUD FLATS CREATED ——— 0.50 AC.
LOW MARSH CREATED ——— 1.82 AC.
HIGH MARSH CREATED ——— 0.62 AC.

PURPOSE/ACTIVITIES: RAISE AND WIDEN LAGUNA SHORES ROADWAY.

DATUM: HOR. – NAD 83
VET. – NGVD 29

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CITY OF CORPUS CHRISTI

MITIGATION SUMMARY TABLE

CITY OF CORPUS CHRISTI
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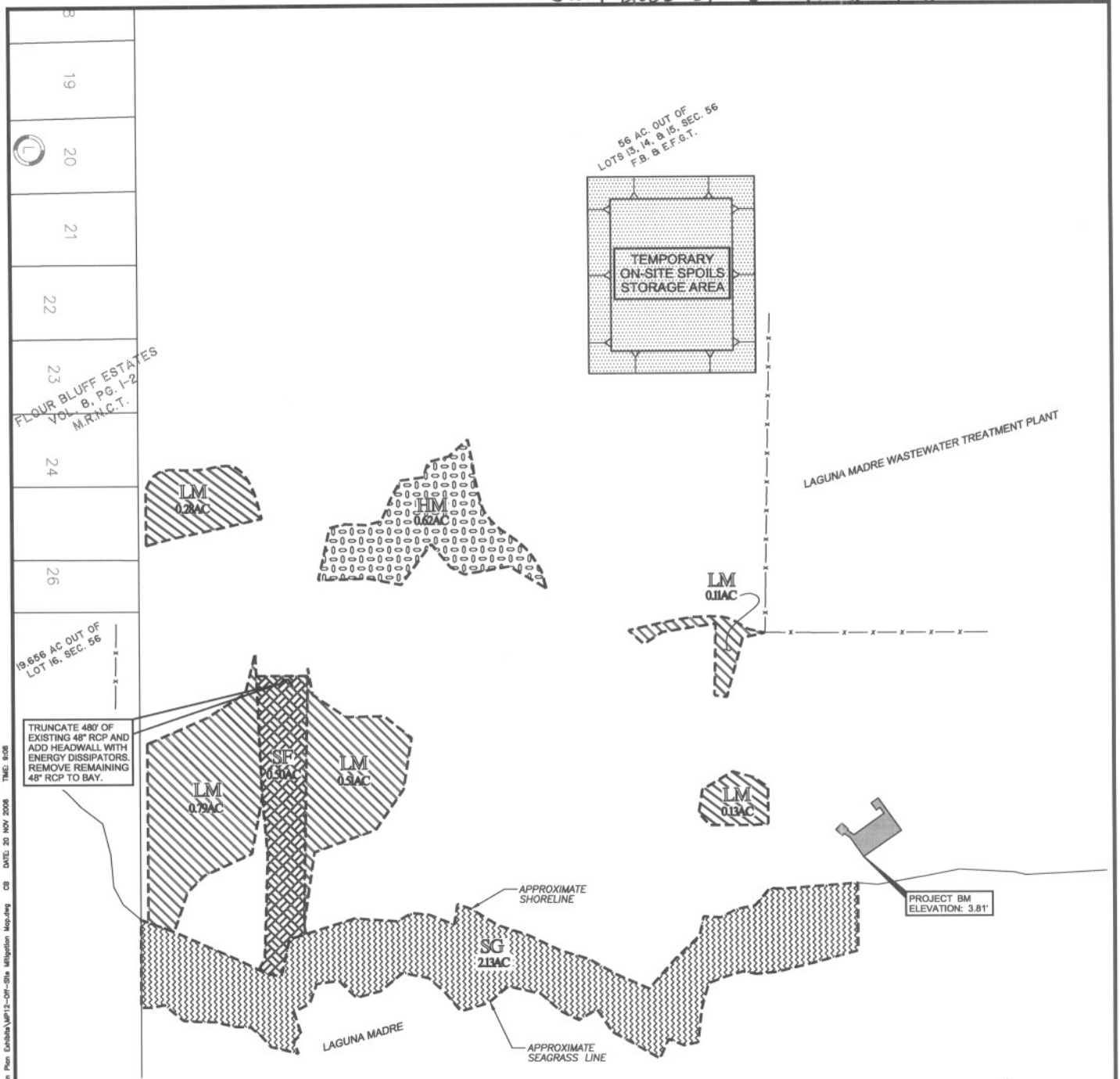
STATE OF: TEXAS
APPLICATION BY: CITY OF CORPUS CHRISTI

FIGURE MP11 DATE: OCT 2008

RVE NAME: R:\CLIENTS\CITY OF CC-7\05023 Laguna Shore Rd-Graham to Hustlin Hornet (jf6278)\CAD\Mitigation\Mitigation Plan Exhibits\MP11-Mitigation Summary Table.dwg CB DATE: 20 NOV 2008 TIME: 9:03

SWG-2006-01048 Attachment "A"



WETLANDS LEGEND

CONSTRUCTED WETLANDS

- SG — SHALLOW WATERS SEAGRASS
- SF — SAND FLATS
- LM — LOW MARSH
- HM — HIGH MARSH

TOTAL WETLANDS CREATED

SHALLOW WATERS SEAGRASS	0.27 AC.	2.13 AC.
SHALLOW WATERS UN-VEGETATED	2.64 AC.	(1.32 AC. SEAGRASS)
SAND/MUD FLATS	0.25 AC.	0.50 AC.
LOW MARSH	0.91 AC.	1.82 AC.
HIGH MARSH	0.31 AC.	0.62 AC.

PREVAILING WINDS

GRAPHIC SCALE 0 100' 200' 300'

PURPOSE/ACTIVITIES: RAISE AND WIDEN LAGUNA SHORES ROADWAY.

DATUM: HOR. – NAD 83
VET. – NGVD 29

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CITY OF CORPUS CHRISTI

OFF–SITE MITIGATION MAP

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FIGURE MP12 DATE: OCT 2008

RVE, Inc. Engineering–Diving–Surveying P.O.Box 2927, Corpus Christi, Texas 78403 820 Buffalo St., Corpus Christi, Texas 78401 phone: 361.887.8851 fax: 361.887.8855 e-mail: rve@rve-inc.com www.rve-inc.com

RVE NAME: R:\CLIENTS\CITY OF CC-7\05023 Laguna Shore Rd-Graham to Hustlin Hornet (@6278)\CAD\Mitigation\Mitigation Plan Exhibits\MP12-Off-Site Mitigation Map.dwg DATE: 20 NOV 2008 TIME: 9:08